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ABSTRACT

Pointing out that the term "videotex" is a general term covering three types of videotex systems, i.e., teletext, viewdata, and cable text, this paper briefly describes such systems and notes that their future depends on social acceptance and permeation as well as government regulations. The difficulties for international videotex networking caused by protocol conversions, politics, packet network delays, and charging difficulties are noted. The report then focuses on videotex activities around the world, including Japan, the United States, Canada, France, Germany, Austria, the United Kingdom, New Zealand, and Australia. The role of videotex in each country's educational system and factors affecting its feasibility are discussed, and examples of its usage are provided. Telesoftware is also discussed, and the paper concludes by forecasting trends and future developments. (DJR)

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# AOLIN

**AUSTRALIAN OPEN LEARNING INFORMATION NETWORK**

## A hitch-hiker's guide to the world of videotex

Paul D. Bacsich & Angela S. Castro

AOLIN, Australia, 1986.

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# A HITCH-HIKER'S GUIDE TO THE WORLD OF VIDEOTEX

**Paul D. Bacsich and Angela S. Castro**

A joint paper delivered on 2 July 1986 by Angela S. Castro at the Seminar on the Future of Videotex in Tertiary Education sponsored by the National Working Party on Telecommunications in Tertiary Education during the 2nd Asian-Pacific Conference and Exhibition held in Sydney.

ABSTRACT

After giving a report of videotex activities around the world, the authors discuss the more sophisticated uses of videotex and end the paper with a prediction of the convergence of technologies.

## A MATTER OF DEFINITIONS

During this Conference, we have all been shown some splendid videotex systems developed by Telecom Australia, business organisations from Australia and overseas, and members of the Australian Videotex Industries Association for their clients. It might be useful to point out that the term "videotex" means more than just a system like Viatel, it is actually a general term covering three particular types of system:

* Teletext;
* Viewdata;
* Cabletext.

Viatel is a viewdata system modelled on its big UK brother Prestel which was introduced by British Telecom in 1978, and we all know what it looks like and what it can do basically. We also know that the reception of, or access to, a viewdata system depends on either the Public Switched Telephone Network (PSTN) or a special cable link and that it allows a certain amount of interactivity depending on the system's degree of sophistication.

Teletext, on the other hand, is perhaps not so well-known in Australia, yet. It looks very much like viewdata in its display format but is different in that the information is delivered via a special part of a television signal (broadcast, cable or satellite). There is no way (usually, except on sophisticated cable systems) of signalling back to the source of the data, so teletext is not really interactive.

Therefore you have people referring to viewdata as "interactive videotex", to teletext as "broadcast videotex". And, of course, "teletext" is quite different from

"teletex", a new form of telex-style electronic mail that we shall hear a lot in the next few months from Telecom Australia when it launches its newest product. To make matters even more confusing, the Germans have named one of their teletext services "videotext"! (Bacsich, in Bates 1984, p.173)

Cabletext is an emerging system that still needs a definition. It is a hybrid technology which is associated with the development of cable TV systems. Its future, like that of the other two, is dependent entirely on the same two factors :

* Social acceptance and permeation;
* Government regulations.

Cabletext gives, however, faster transmission, has higher capacity, faster frame display and real picture quality.

As far as the viewer is concerned, he would not notice any drastic difference between these three services. But depending on the particular cable configuraton used, prices and tariffs could be different resulting perhaps in dearer teletext and cheaper viewdata.

In the US, however, the term videotex is now also used to cover information services in ASCII, which the American Videotex Industries Association is exploiting as additional delivery options because of their advantages for many database operations.

**A GLOBAL VIDEOTEX NETWORK**

Before we commence our hitch-hiker's tour of the world of videotex, we regret to say that a global videotex network is still very distant on the horizon.

While Europe and Canada are leading the field in videotex, with the United States and Japan seeemingly trailing a poor second and third, these countries have problems linking their systems together into a world network.

It is true that the Prestel system has been adopted, at the last count, by something like 26 countries, for example, most of the European countries, Australia, Hong Kong, Malaysia, New Zealand and Singapore (Budde 1986). It is also true that the various European videotex networks are gradually attempting to interlink, for example, there were trials beginning in 1985 on links between France and Germany, and another trial in 1986 between France and the United Kingdom. However, two major European countries use different, though related, videotex standards: Teletel in France and the CEPT standard in Germany. This makes it hard to interlink them. United States and Canada have their own, rather different standard: NAPLS, with more emphasis on graphics. Then we have Japan experimenting with its own standard for internal consumption only.

Briefly, we would say that currently there are the following stumbling blocks to international videotex networking:

* Protocol conversion, e.g. Teletel to Prestel, in both format and commands.

* Politics, it is difficult to get one country to agree to adopt the standard of another, not to mention getting several countries to agree to adopt only one single standard.

* Packet network delays, for example, character reflection. Ideally international networking should use the gateway protocol so that single-character packets do not fly around so much, but the problem is that there are more than one gateway protocol to choose from!

* Charging difficulties, for example, a British subscriber will use PSS/IPSS/Austpac to get onto Viatel, but it is slow, expensive and there are too many layers of charges involved.

Let us make Japan our first port of call.

**JAPAN**

Japan has a high resolution videotex service called Captain, which has 8000 subscribers and 500 information providers. Rival services using NAPLS have entered the market and now private systems using either standard have started to proliferate.

As far as the use of videotex in education is concerned, there is very little published in international conference proceeedings and industry newsletters and we have only the following rather sketchy information:

1 Tokai University is working on a resource database of 10,000 items and intend to use artificial intellegence techniques to simplify user retrieval.

2 The Omori No. 1 Elementary School carried out a trial of the Captain videotex system in 1982, but surprisingly Japan has not considered introducing computer-based learning (CBL) into Captain or the use of micros for accessing Captain.

3 Modern Information Research Institute has been conducting a market acceptance test of educational Captain frames by a group of primary children watching at home with their mothers.

**UNITED STATES**

In North America, there has been a close link between teletext and viewdata, more so than there is in Europe. It also runs a larger number of teletext trials, but there has been no attempt at the provision of a large-scale teletext service.

The case of the United States is an interesting one. At the moment, it is not a leader in world videotex for a number of reasons.

In May this year, Viewtron, the largest American videotex operator, closed down after suffering a loss of US$50 million. Before that, the same fate befell two newspaper-sponsored operators. High costs and slow transmission of elaborate colour graphics information are often cited as the major reasons why American users do not favour videotex services.

Mike Thomson, writing in Communications World this month, gave the following additional reason:

> The outstanding problem for the US compared with other countries has been the absence of a dominant telecommunications carrier to provide both the host system and a packet-switching network. The ill-fated US videotex pioneers were essentially regional operators whose service lacked credibility as a national marketing medium. (Thompson, p.14)

Another reason is the strong growth of character-only information services on monochrome screens. There are now 500,000 subscribers in America paying for ASCII services from companies like Dow Jones, Dialog and Compuserv. The US Department of Commerce has forecast that ASCII subscribers will reach four million by 1990, whereas the videotex colour graphics users will only number about 100,000 by that date (Thompson, p.14).

There are now, however, two emerging powerful videotex operators on the US market, Covidea and Trintex. The first company is a joint venture of the Bank of America, the Chemical Bank of New York, Time Inc. and AT&T. The services provided are home and small business banking as well as information from the New York Times and Money Magazine. Covidea's prime market is personal computer users but it also offers AT&T's interactive terminal with a built-in modem for less than US$100 as a low cost entry unit.

Trintex is a partnership between IBM, CBS and Sears. It is planning to transmit data in both ASCII characters and NAPLS colour graphics formats. Sears is in it obviously because of its teleshopping potential, but IBM is also making the most of an ideal situation to promote its personal computers as the preferred videotex terminal for both home and office.

As for the educational use of videotex, the development is very fragmented and regionally-based. At the moment, United States is less active and less innovative than Canada. We shall briefly describe some low-level activities. The 1985 Videotex-Teleservices Directory lists eight North American universities and colleges. This list is , however, by no means full because it does not list those sites doing more fundamental research into the technology.

Videotex has been used by:

* Channel 2000 in conjunction with Band One and the Ohio College Library Consortium wich produces a 32,000 page encyclopaedia; and

* San Francisco State University.

The latter has a "pseudo-videotex" hybrid system with one-way cable but touch-tone phone return channel. It has 425 pages of information, updated regularly; and has totalled 500,000 information requests over the last 12 years, running at approximately 850 each day in 1984.

**CANADA**

Canada, together with the US, is a pioneer of the alpha-geometric NAPLS standard. Telidon, the famous Canadian videotex system using this standard, however, differs from either Prestel or Viatel in that it is not one single service, but a collection of services accessible through the Canadian Datapac service.

Now the educational scene is quite different in Canada as there have been many trials, and we will just list a few:

1 TVOntario: this TV network carried out a large scale educational trial using initially only teletext but later soon broadened to videotex as well. It was almost all for the school sector.

2 Bell Canada conducted a Vista Trial between January 1981 and September 1983 but the approach was very conventional. One information provider, Edemedia, put up 6000 pages of information on university courses and some quizzes and teaching sequences on biology.

3 Alberta Correspondence School did a small trial in 1981 of Telidon used for "delivering" educational material and using quizzes to grade students' work.

4 The Manitoba Telephone System did a series of Ida and Elle Trials. These were interesting because they used CBL on Telidon. One information provider, Cybershare, offered a small but highly interactive database of educational materials aimed at high-school/community college level, and the subjects taught were BASIC, mathematics, finance and electricity. There was also an

Infomart Grassroots service (demonstrated at the Conference), which, though marginally an agricultural extension type program, offered simulation and calculation programs on feed lots and loans.

5 The universities of Victoria and Waterloo developed a version of NATAL with a Telidon interface. (NATAL is the Canadian national authoring language.) This version is now being used for CBL in physics and language arts. The Tele-Universite du Quebec has also developed a Telidon interface to PLATO and has started a distance education service for the province.

The above is just a handful of general examples. The universities of Toronto, Montreal, and Vancouver are also very active. We would just like to mention that the universities of Calgary and New Brunswick also ran trials linking Telidon with audio teleconferencing on multiple sites. The Open University in the UK has been doing it since 1975, and we see this as something that Australian educators could well take up and use since we are all very keen on audio teleconferencing here already.

What we think is most encouraging is the Telidon Content Development Program. This Canadian $5 million program was announced in early 1984. It funded 27 projects concerned with extending the uses of Telidon. This program funded the following activities:

1 Edemedia in Quebec City developed an information system in French for farmers.

2 InforNorth and Laurentian University in Sudbury have been developing Telidon-based courseware which are then distributed by video and full-channel teletext throughout the Northern Cable Services Network.

3 The Tele-Universite du Quebec has been creating courseware for 20 adult education courses.

4 The University of Western Ontario is providing a Telidon educational support service for its students.

5 The University of Prince Edward Island in Charlottetown has been collaborating with Red Cross and IEA in the production and marketing of micro-based educational material via Telidon.

Finally, with regard to Canada, we would like to mention the use of videotex for career guidance. The Ministry of Education in Quebec had a Student Guidance Service, and TVOntario converted it to Telidon in 1983. Guidance service is now delivered to 90 terminals spread throughout the province.

**FRANCE**

There has been relatively little use of videotex in European education and training. The United Kingdom is an exception.

We will briefly outline what some Euopean countries are doing before we go to the United Kingdom.

France is the big videotex success story. The French Government launched the innovative scheme of allowing its citizens a choice of a telephone directory in a hard copy form or on or a free videotex terminal (which can be exchanged for another one if it develops a fault). This has stimulated both the software and hardware videotex markets. So by the third quarter of last year:

> One million Minitel terminals were in place - and they were being used for accessing 2500 different services offered by 1200 information providers to the tune of two million connect hours a month. Smart cards for use with terminal readers will soon enhance the system as a grassroots EFT/POS network. (Luis Huesch 1986, p.20)

As for educational use of videotex, over twenty educational videotex services are listed in the December 1985 issue of the Annuaire des Services Teletel. Two of these, PROFESSEUR SUSAN and TELEMEDIATHEQUE GIRONDE, are listed as involving CBL. The latter is very well-known but targeted at school children. There is also a trial of registration for university courses going on in Lille.

**GERMANY AND AUSTRIA**

In West Germany, Bilschirmtext (BTX) built services around the gateway concept it originated. A central computer holds the high-level grahphics database and this is linked to 12 regional computers. These serve as gateways to about 130 external hosts tied in via the packet-switched network.

> Subscribers hover around the 34,000 mark, catered for by a massive 4000 information providers and 4500 sub-information providers. Access charges are subsidised by the PTT, which users its monopoly to keep potential competitors regulated out of the market. (Huesch, p.20)

In Germany and Austria, a total of about 30 universities are experimenting with videotex, with emphasis on providing general information on courses. A major contribution is the FernUniversitaet in Hagen with 1500 pages including some CBL (The BIRD Project). The Vienna University of Economics is the most developed, with an information and electronic mail system, and ambitious plans. The University of Graz houses the group which developed the famous Austrian system Mupid, but the group's activities seem mainly oriented to the commercial market. They have recently developed a Mupid-based CAL authoring system based on PLATO, in conjunction with Control Data Corporation.

**UNITED KINGDOM**

Barclays Bank has been using videotex for staff training for several years. The system runs on Rediffusion computers, once a popular choice in Britain for videotex use, but very non-standard. It uses a purpose-written, non-portable videotex and CBL system of a useful, though relatively simple-minded type. They have 60 courses consisting of an average of 450 frames, with a running time of between 0.5 and 3.5 hours.

Of course, one must not forget the ubiquitous Prestel. We have all heard of Prestel's strategy of offering specific products aimed at certain target groups. For example:

1 Prestel Citiservice is a financial investment service first offered in Spring 1983 through a Prestel Gateway. It is a joint venture between Prestel and ICV Information Systems.

2 Prestel Homelink is a home banking and teleshopping service provided by the Nottingham Building Society and the Bank of Scotland and operated via the Prestel Gateway.

3 Prestel Farmlink was launched on 10 April 1984 via a Gateway. It is a comprehensive farm management service for the South West of England and will be progressively extended nationwide. Jan Shearer gives these details about the service:

> [which is] designed to help farmers make the most of their experience and judgement, cutting down on time spent looking up and telephoning round for information or talking to sales reps. Today, more than ever before, the efficient running of a farm depends on having the right information at the right time and Farmlink gives this 24 hours a day. The information is localised but also has national aspects and gives, for example, the latest news on crop problems, weather, market prices and pest warnings. (Shearer, p.112)

So it is similar to the Infomart Grassroots service in Canada, which is being demonstrated during this Conference.

4 Prestel Homefinder is a residential property service.

5 Prestel Travel is a travel service allowing airline booking in real time.

6 Prestel Racing offers betting opportunities and is of course aimed at race-course punters.

7 Prestel Micronet 800 offers telesoftware, a microcomputer club, and a whole range of services for computer users.

## 8 Prestel Education.

We will devote some time to Prestel Education later on. For the time being, let us quote Jan Shearer (1984, p.113) on some 1984 statistics about Prestel:

| | |
|---|---|
| No. of terminals attached to the Prestel Network | 42,000 |
| Proportion of terminals in business | 63% |
| Proportions of terminals in homes | 37% |
| No. of contracted information providers (IP) | 159 |
| No of information sources (including IP and sub IP) | 1200+ |
| No. of frames available for access | 317,000 |
| Average no. of frame access in month | 15.2 m. |
| Average no. of messaging per month | 186,000 |
| No. of operational gateway to external computers | 16 |

Luis Huesch, writing in 1986, reported 24 gateways, 60,000 subscribers, and 400 private competitors. So the videotex industry is very strong in Britain. Prestel has been operating at a profit, so much so that for a few years now it has been giving free access after 6 pm and before 8 am on weekdays, and from 1 pm on Saturday and whole day on Sunday.

The United Kingdom is also very active in teletext. You might have heard of BBC's CEEFAX, ITV's ORACLE and Channel Four's 4-TEL.

Three specialised applications have been developed recently by British teletext systems. These are:

1 For deaf viewers. Teletext pages can be displayed "mixed" with TV pictures. Now, many televsion programs have teletext subtitles for deaf viewers.

2 Broadcast telesoftware. Teletext pages can store computer programs which can then be recorded off-air directly into a microcomputer. CEEFAX broadcasts a telesoftware service on page 700 specialising in BBC micros.

3 Support information associated with some particular television programs or subjects. Recent broadcast such as Channel Four's "4-Computer Buffs" have used teletext to provide follow up information or general details which are available for much longer use than the program could allow on air originally. Similarly, details of the

Channel Four licensing scheme for educational recording of programmes are carried on teletext pages.

Each teletext service is only available during its particular channel's broadcasting hours (including test card). So it is not a 24-hour service but it is available free to all viewers.

As for cabletext, Thorn-EMI have been experimenting with a local teletext service on their Swindon Cable System since 1982. A teletext magazine called Skytext, prepared by British Telecom, has appeared on the European/UK Sky Channel.

Teletext, as we said at the beginning of this paper, can also be delivered by satellite (e.g. the B-MAC method); and the IBA have just advertised a Radiotext franchise to be available on two London commercial stations.

**NEW ZEALAND**

New Zealand launched its Videotex Access Service in May 1984 but had some hardware problems when the public response was stronger than anticipated. A new service handling up to 8000 users is now ready. Some 20 system operators hang off the New Zealand Post Office Gateway service as closed user groups paying a subscription. The New Zealand Post Office also operates Myriad, a small Prestel (but non-public) serivce. Videotex '87 to be held in New Zealand will give us an opportunity to observe how education is taking advantage of videotex.

**AUSTRALIA**

Australia has embraced videotex with rigour and enthusiasm.

Paul Budde, one of the leading videotex consultants in Australia, provides these figures on the three leading national systems:

* Farmlink, established by Elders IXL for agribusiness and farmers in December 1984, has 2500 subscribers.

* Aftel, the travel industry service established in July 1984, has 800 subscribers.

* Viatel, established by Telecom Australia as the public system in February 1985, has 13,000.

Viatel is tipped to double its user numbers to 20,000 by the end of 1986, and to reach 60,000 by the end of 1990. Private videotex systems will soar from 25 in 1985 to about 100 by the end of 1986, and to 150 by 1990. The growth is quite spectacular if one considers how long Prestel took to reach where it now stands. Prestel, with a market six times the

size of Australia, took one year to achieve the same number of users as Viatel in three months.

We think that Telecom Australia 's provision of a public system is a very sound one for two reasons alone:

* Viatel has now imposed an industrial standard, which is much needed in telecommunications.

* Viatel's national profile means that more and more Australians will subscribe to the service, which will then act as a gentle initiation to technological uses for the less computer-literate members of the public.

Our only criticism, from the aspect of education, is that there is currently too much of a bias towards the business community by Telecom Australia. Brian Smith, the Business Manager of Viatel, has retaliated by saying that the Education Sector must rationalise its videotex activities and speak as one voice to Telecom Australia. This is a fair challenge that the Education Sector must meet very soon before it is left too far behind.

Angela Castro, in her paper yesterday, spoke of the 4 C's:

* Courses;
* Career;
* Curriculum; and
* Computing.

These are the foci of Prestel Education. In Australia, no such foci has been established for either the school sector or the tertiary sector.

Take the first C. Some preliminary efforts were taken by a couple of bureau services to list tertiary courses, but such efforts have been very fragmented and the course databases have not been properly designed to facilitate national entries in a standard format.

While the Australian institutions are more or less doing their own thing, universities and polytechnics in the UK have put all their education course information on ECCTIS, a system that runs on the Open University Computer, a Speery configuration of videotex 1100 in Milton Keynes but which has a gateway to Prestel. There are about 50,000 records at the moment and the figure should reach 80,000 by the end of this year. It uses a thesaurus called ECOT.

ECCTIS stands for "Educational Counselling and Credit Transfer Information System". While the original intention of using the database for credit transfer (or as we call it here in Australia, cross-crediting) is still unrealised, the vast number of entries have helped somewhat in the individual counselling aspect in that students can get some comprehensive information on the type of courses that they can take at an institution of their choice.

This is an issue that the whole Australian Education Sector perhaps want to consider very carefully. Anthony Pritchard and David Jones published a report for CTEC (Commonwealth Tertiary Education Commission) last year urging that cross-creditng arrangement should be encouraged among institutions. Having a comprehensive course listing is obviously a good first step. But it cannot be done on a shoestring budget without pooled resources, Government subsidy and a sound managaement structure to develop and maintain it. We are of the opinion that the Australian ECCTIS should be on an external computer but accessed via a Viatel Gateway. The Viatel charges for such a system are briefly as follows:

| | |
|---|---|
| Monthly subscription fee: | |
| 50 frames & 5 Gateway channels. | $360 |
| Additional monthly frame-rental per frame available in only lots of 50. | |
| 50 to 1000 | $ 0.45 |
| 1000 to 5000 | $ 0.30 |
| Over 5000 | $ 0.20 |

Without mentioning Austpac leased line and other charges, it will not take long for institutions to work out what a huge financial undertaking such a course database (requiring thousands of frames and sophisticated routing) can be.

As for Computing, the fourth C, again, very little has been done. The only notable event is the compilation of a listing of software for schools by the Western Australia Institute of Technology. Some efforts apparently are being made in a Victorian college and in a couple of universities to use videotex to teach informatics and database design, but that is all.

We would like to mention here the issue of telesoftware. Microtext 666 in Australia is similar to Micronet 800 in the United Kingdom, and telesoftware is a success story on British and Australian videotex systems. But the downloading of programs from videotex is not a straight forward matter, as Andrew Wallis, the Technical Director of Intelfax Ltd., said to the participants of the Videotex User Conference in the UK this year. Scott Sanderson of Information Solutions in Melbourne gave a similar warning at his talk this morning.

Personally, we also feel that educators who are thinking of downloading or uploading CBL programs via videotex have to be very patient users. Can one write suitable CBL for university use in under 40 k codes? Peter Zorkoczy of the Open University points out, quite rightly, that there are much better ways of transmitting telesoftware, and one of them is through data networks. But most data networks have not been out to woo the relatively unsophisticated users, so it was left to the videotex people to control the market, using inelegant but workable ways. (Bacsich in Bates 1984, p.177).

## TRENDS AND FUTURE DEVELOPMENTS

We would now like to end our paper by doing some selective crystal ball gazing, and we shall be doing it without making any particular reference to the Education Sector which is, as we have repeatedly said, still in a state of lethargy and confusion when it comes to using technologies.

1 ASCII videotex and better access

We think that the present American trend of ASCII videotex services will spread soon to Australia, and they will address specific market segments.

Present information providers, therefore, will have to supplement their particular service with a broad range of other relevant information. Mike Thompson has this to say about the wisdom of the Commonwealth Bank of Australia:

> The Commonwealth Bank knew this when it elected to offer its service on Viatel rather than go it alone. Few applications will continue to satisfy the user on their own. (Thompson, p.14)

It is also likely that the public will have more and more opportunity to use videotex without having to buy their own terminals. Banks will either provide customers with cheap terminals for electronic fund-transfer (EFT), or free terminals at point-of-sale (POS). Some Australian local councils are already providing free but rigidly built terminals at selected locations to their rate-payers, for example, the Town Crier system being demonstrated at the Conference.

2 Gateways and private systems.

For people who are not impressed by the very basic level-1 capability of Prestel-like systems, they can either have a more intelligent, private system developed for them by one of the many excellent consultants firms in Australia, or by themselves. But one other solution is to look at the gateway concept. ECCTIS, mentioned earlier, is an example.

The Scotish Council of Educational Technology, however, has developed its own private system, so has the National Extension College (MARIS) and the Open University (Optel). The Open University's Optel system was demonstrated at Deakin University in March this year during a workshop on media and telecommunications. One of the attractions of that system is the use of the DEC mail program MM in a videotext format. This enables a user to send very long messages and to retrieve them in a variety of ways. Paul Bacsich, author of the system, says that the system can handle very sophisticated searches and therefore gives a greater degree of interactivity than is presently available on Prestel.

Indeed, it is not hard to develop more and more intelligent videotex systems using high-level computing techniques. If

one thinks of an alpha-geometric terminal as essentially a computer graphics terminal, or uses a newer alpha-mosaic terminal that can display 80-character lines, then you cannot distinguish the sophisticated videotex programming from general interactive computing.

3 The economics of technological enhancements.

At this Conference, we have a demonstration of the new photo videotex and the talking videotex. While the former will have a number of immediate applications and the second development is perhaps still too limited to be of any real use, the coming of such new but expensive technologies mean that only the big operators can play the game of videotex in future.

In recent months, big libraries in the UK and the US have been rushing to put their holdings on compact disks. This new medium of data storage will also have an effect on videotex systems. As Mike Thompson says:

> Most US systems developers expect compact disk technology to provide PC users with 500 million characters of online information in the near future. This large pool of static data and colour graphics will be supplememted by the transmission of volatile data and transaction between the user's PC and the public database operation. Applications such as teleshopping from videocatalogue will then emerge, in conjunction with EFT/POS services. (p.15)

Our prediction is that some major operators which can afford these new enhancements will emerge and provide an umbrella service to the less financially endowed and less technologically minded information providers.

In the next ten years, the major advance will probably be the advent of the ISDN, or the Integrated Service Digital Network, which will bring reasonably high speed data links into people's homes. A by-product of the ISDN should be a country-wide "intelligent" data network with reasonable transmission costs, permitting the wide-spread use of most of the videotex and relating techniques currently being developed.

> Indeed . the present distinctions between viewdata, computer, telewriting, and facsimile terminals will probably have vanished. Whether this means that viewdata has "won" or "lost" depends on your point of view. (Bacsich in Bates, p.183)

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